

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

4N38(Short), 4N38A(Short)

AC LINE / DIGITAL LOGIC ISOLATOR.

DIGITAL LOGIC / DIGITAL LOGIC ISOLATOR.

TELEPHONE LINE RECEIVER.

TWISTED PAIR LINE RECEIVER.

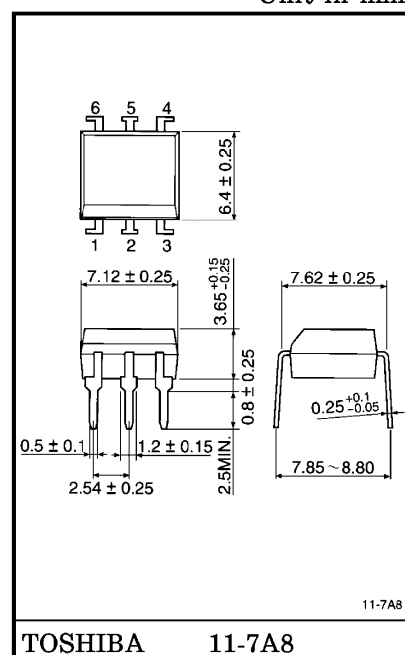
HIGH FREQUENCY POWER SUPPLY FEEDBACK CONTROL.

RELAY CONTACT MONITOR.

Unit in mm

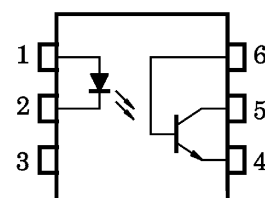
The TOSHIBA 4N38 (Short) through 4N38A (Short) consists of a gallium arsenide infrared emitting diode coupled with a silicon phototransistor in a dual in-line package.

- Switching Speeds : $3\mu\text{s}$ (Typ.)
- DC Current Transfer Ratio : 100% (Typ.)
- Isolation Resistance : $10^{11}\Omega$ (Min.)
- Isolation Voltage : 2500Vrms (Min.)
- UL Recognized : UL1577, File No. E67349



Weight : 0.4g

PIN CONFIGURATIONS (Top view)



- 1 : ANODE
- 2 : CATHODE
- 3 : N.C.
- 4 : EMITTER
- 5 : COLLECTOR
- 6 : BASE

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- Gallium arsenide (GaAs) is a substance used in the products described in this document. GaAs dust and fumes are toxic. Do not break, cut or pulverize the product, or use chemicals to dissolve them. When disposing of the products, follow the appropriate regulations. Do not dispose of the products with other industrial waste or with domestic garbage.
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MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current (Continuous)	I_F	80	mA
	Forward Current Derating	$\Delta I_F / ^\circ\text{C}$	1.07 (*)	mA / $^\circ\text{C}$
	Peak Forward Current (Note 1)	I_{PF}	3	A
	Power Dissipation	P_D	150	mW
	Power Dissipation Derating	$\Delta P_D / ^\circ\text{C}$	2.0 (*)	mW / $^\circ\text{C}$
	Reverse Voltage	V_R	3	V
DETECTOR	Collector-Emitter Voltage	BV_{CEO}	80	V
	Collector-Base Voltage	BV_{CBO}	80	V
	Emitter-Collector Voltage	BV_{ECO}	7	V
	Collector Current (Continuous)	I_C	100	mA
	Power Dissipation	P_C	150	mW
	Power Dissipation Derating	$\Delta P_C / ^\circ\text{C}$	2.0 (*)	mW / $^\circ\text{C}$
COUPLED	Storage Temperature	T_{stg}	-55~150	$^\circ\text{C}$
	Operating Temperature	T_{opr}	-55~100	$^\circ\text{C}$
	Lead Soldering Temperature (at 10s)	T_{sol}	260	$^\circ\text{C}$
	Total Package Dissipation	P_T	250	mW
	Total Package Power Dissipation Derating	$\Delta P_T / ^\circ\text{C}$	3.3 (*)	mW / $^\circ\text{C}$

(Note 1) Pulse width 300 μs , 2% duty cycle.(*) Above 25 $^\circ\text{C}$ ambient.

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V_F	$I_F = 10\text{mA}$	—	1.15	1.5	V
	Reverse Current	I_R	$V_R = 3\text{V}$	—	—	100	μA
	Capacitance	C_D	$V = 0, f = 1\text{MHz}$	—	30	—	pF
DETECTOR	DC Forward Current Gain	h_{FE}	$V_{CE} = 5\text{V}, I_C = 500\mu\text{A}$	—	200	—	—
	Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 1\text{mA}$	80	—	—	V
	Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 100\mu\text{A}$	80	—	—	V
	Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	$I_E = 100\mu\text{A}$	7	—	—	V
	Collector Dark Current	I_{CEO}	$V_{CE} = 60\text{V}$	—	1	50	nA
	Collector Dark Current	I_{CBO}	$V_{CB} = 60\text{V}$	—	0.1	20	nA
	Collector-Emitter Capacitance	C_{CE}	$V = 0, f = 1\text{MHz}$	—	10	—	pF
	Current Transfer Ratio	I_C / I_F	$I_F = 10\text{mA}, V_{CE} = 10\text{V}$	10	100	—	%
COUPLED	Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_F = 20\text{mA}, I_C = 4\text{mA}$	—	—	1.0	V
	Capacitance Input to Output	C_S	$V_S = 0, f = 1\text{MHz}$	—	0.8	—	pF
	Isolation Resistance	R_S	$V_S = 500\text{V}, \text{R.H.} \leq 60\%$	10^{11}	—	—	Ω
	Isolation Voltage	BV_S	AC, 1 minute	2500	—	—	Vrms
		$BV_S (*)$	AC, peak	1500	—	—	Vpk
				2500	—	—	
			AC, 1 second	1775	—	—	Vrms
	Turn-On Time	t_{ON}	$V_{CE} = 10\text{V}, I_C = 2\text{mA}$	—	3	—	μs
	Turn-Off Time	t_{OFF}	$R_L = 100\Omega$	—	3	—	

(*) JEDEC registered minimum BV_S , however, TOSHIBA specifies a minimum BV_S of 2500Vrms, 1 minute.

